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PENSOFT

First records of species of the Spissipes Section (*Culex* (*Melanoconion*)) (Diptera, Culicidae) in Guainía Department, Colombia

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Abstract

The Spissipes section of the subgenus *Melanoconion* Theobald, 1903 of *Culex* Linnaeus, 1758 (Diptera, Culicidae) consists of 23 species, many of which transmit various subtypes of Venezuelan equine encephalitis virus. Members of the Spissipes section are distributed throughout the American tropics, and most species are associated with mesic sylvatic environments. Here are reported two first records of Spissipes section females from Guainía Department, Colombia. Females of *Culex gnomatos* Sallum et al., 1997 and *Culex portesi* Senevet & Abonnenc, 1941, were observed biting the author and photographed *in situ*.

Keywords

Culex, distribution, Venezuelan equine encephalitis virus

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Introduction

The Spissipes section of the subgenus *Melanoconion* Theobald, 1903 of *Culex* Linnaeus, 1758 (Diptera, Culicidae) consists of 23 species (Sallum et al. 1997), many of which transmit various enzootic subtypes of Venezuelan equine encephalitis virus (VEEV) (Weaver et al. 2004). Members of the subgenus *Melanoconion* are considered difficult to identify based upon external morphology of the adult (Torres-Gutierrez and Sallum 2015), which complicates field investigations of vector ecology. Most species within the Spissipes section are considered denizens of mesic sylvatic environments (Sallum and Forattini 1996; Méndez et al. 2001); thus, distribution records for Spissipes section mosquitoes are inadequate, especially in the expansive and sparsely populated Amazon Basin of South America (Alvis 2020).

The Department of Guainía is situated in the easternmost portion of Colombia and borders Venezuela and Brazil. The department is large (72,238 km^2) and sparsely populated (0.67 persons/km^2), ranking last among Colombia's 33 departments in population density (DANE 2020). The capital, Inirida, lies near the confluence of the Guaviare and Inirida rivers, and is home to approximately 60% of the population of the department (approximately 50,000 total inhabitants). The remainder of the population of Guainía are indigenous peoples, including the Baniwa and Kuripaco, who live

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in communities of 100–400 persons that are scattered throughout the department (Arellano et al. 2019), often along rivers.

Currently, no surveys of the mosquitoes of the Department of Guainía have been published, although a survey of mosquitoes the neighboring department, Vichada, was recently compiled (Alvis 2020). Surprisingly, no members of the Spissipes section were recorded in that exhaustive survey, which included 21,955 mosquito specimens, distributed among 35 species, captured in traps, biting humans, and in larval surveys. Due to the importance of Spissipes section mosquitoes in the transmission of VEEV and the paucity of distribution records of this group in eastern Colombia, individual records are warranted.

Methods

Female mosquitoes that bit the author during a brief excursion to two indigenous communities in Department of Guainía were photographed at high magnification and the images used to identify them. Dorsal and lateral aspects of female mosquitoes that bit the author were photographed with Canon 6D Digital SLR Camera (Canon, USA), using MPE (5:1) macro lens (Canon, USA), and macro twinlight (Canon, USA). Multiple images (15–25) were taken from each perspective (dorsal and lateral). These were combined into composite images using focus-stacking software (Zerene Stacker v. 1.04, Zerene Systems, USA). The images were cleaned and the background removed using Photoshop 2020 (v. 21.1.2; Adobe, USA). Females were identified using the keys by Sallum and Forattini (1996) and Sallum et al. (1997). Specimens were not curated for this report.

Results

***Culex* (*Melanoconion*) *gnomatos* Sallum, Hutchings & Ferreira, 1997**

Figure 1A

New record. COLOMBIA – **Guainía** • Comunidad El Remanso; 03°28′59.3″N, 067°57′04.9″W; 99 m alt.; 26.XII.2021; N.D. Burkett-Cadena obs.; biting; 1 ♀.

Identification. The adult female of *Cx. gnomatos* is distinguished from other members of the Spissipes section of *Melanoconion* by the combination of dark-scaled hind tarsi, yellowish integument of the pleuron, with dark areas on the anterior mesokatepisternum, prealar knob, and upper and lower mesepimeron, with narrow falcate scales of head dark medially and pale laterally, absence of small golden setae on median mesepimeron, and presence of lateral patches of pale scales on abdominal tergites (Sallum et al. 1997; Fig. 1A).

Distribution. Previously known from Brazil and Peru (Wilkerson et al. 2021).

A single female of *Cx. gnomatos* was observed at the community of El Remanso shortly after dusk, approximately 1800 h, biting the author.

***Culex* (*Melanoconion*) *portesi* Sevenet & Abonnenc, 1941**

Figure 1B

New record. COLOMBIA – **Guainía** • Comunidad La Ceiba; 03°37′43.2″N, 067°52′56.7″W; 96 m alt.; 27.XII.2021; N.D. Burkett-Cadena obs.; biting; 1 ♀.

Identification. The adult female of *Cx. portesi* is distinguished from other members of the Spissipes section of *Melanoconion* by the combination of dark-scaled hind tarsi, yellowish integument of the pleuron, with areas of dark integument on the postspiracular area and prealar knob, with narrow falcate scales of head dark anteriorly and pale posteriorly, absence of a patch of pale scales on the upper mesokatepisternum, and presence of lateral patches of pale scales on abdominal tergites (Sallum and Forattini 1996; Fig. 1B).

Distribution. Previously known from Brazil, French Guiana, Guyana, Suriname, Peru, Trinidad, and Venezuela (Wilkerson et al. 2021).

Discussion

The records of Spissipes section females from the Department of Guainía, Colombia (Fig. 2) helps to fill gaps in the distribution of an important vector group. *Culex gnomatos* is the most recently described species of the section (Sallum et al. 1997) and had only been recorded from Brazil and Peru (Wilkerson et al. 2021). *Culex gnomatos* was found to be the most abundant species of mosquito (constituting 21–26% of total individuals of ~40 species sampled) in two separate inventories of the mosquito communities along the Araçá (Hutchings et al. 2018) and Padauari rivers (Hutchings et al. 2016), tributaries of the río Negro in the northwestern Brazilian Amazon. Since the Guainía River is also a tributary of the río Negro, drains the same extensive rainforest biome, and is only ~500 km from the sites of Hutchings et al. (2016, 2108), the presence of *Cx. gnomatos* in Guainía is not unexpected. *Culex gnomatos* is an important and efficient vector of several arboviruses, including Venezuelan equine encephalitis in the Amazon Basin (Torres-Gutierrez and Sallum 2015).

Culex portesi was previously recorded from Brazil, French Guiana, Guyana, Peru, Suriname, Trinidad, and Venezuela (Wilkerson et al. 2021). *Culex portesi* is considered common in the Amazon region and was the second and fourth most collected species in two separate studies (Hutchings et al. 2016, 2018). This record from Guainía represents the first report of this species from eastern Colombia. Numerous arboviruses, including Venezuelan equine encephalitis, have been isolated from *Cx. portesi* in multiple countries (Torres-Gutierrez and Sallum 2015).

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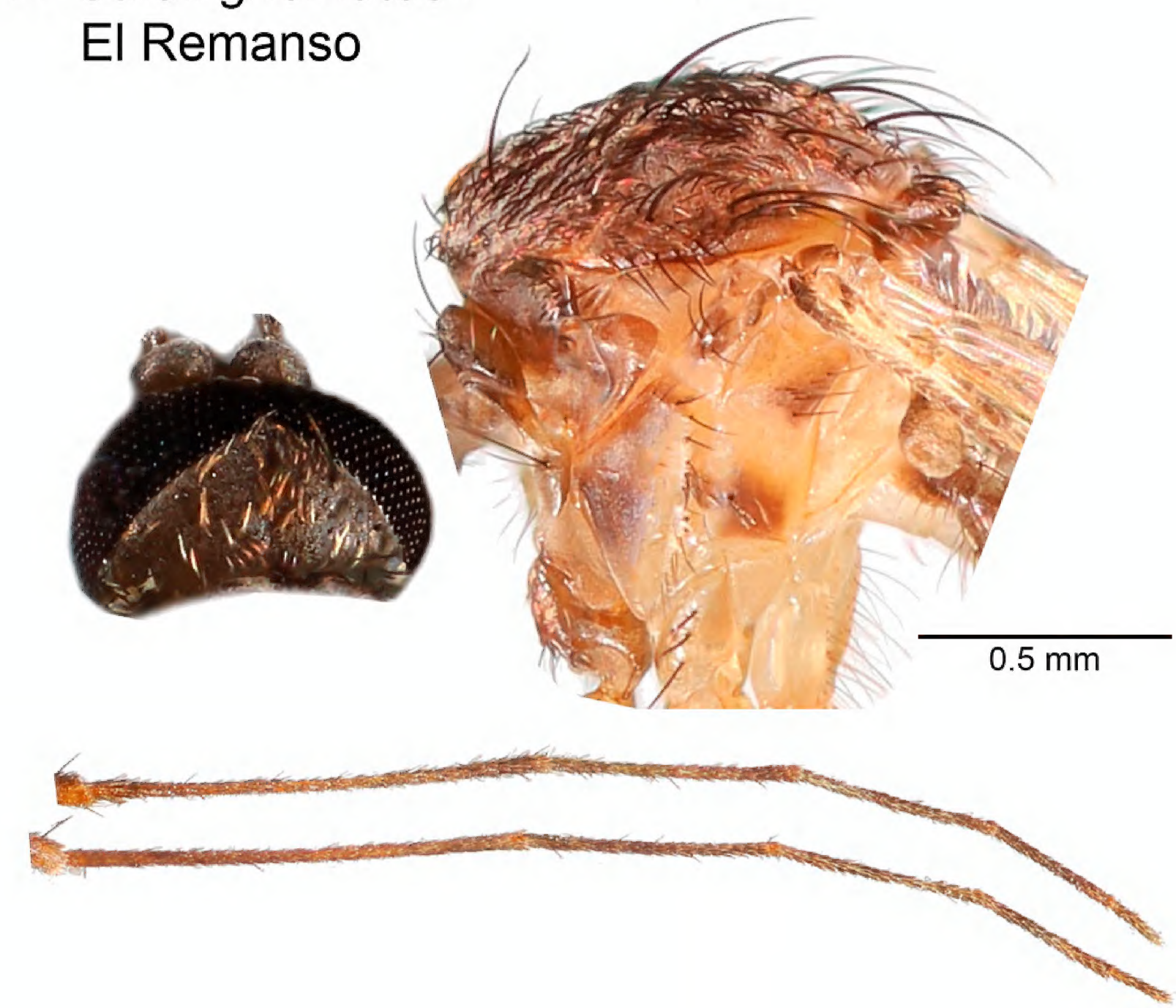

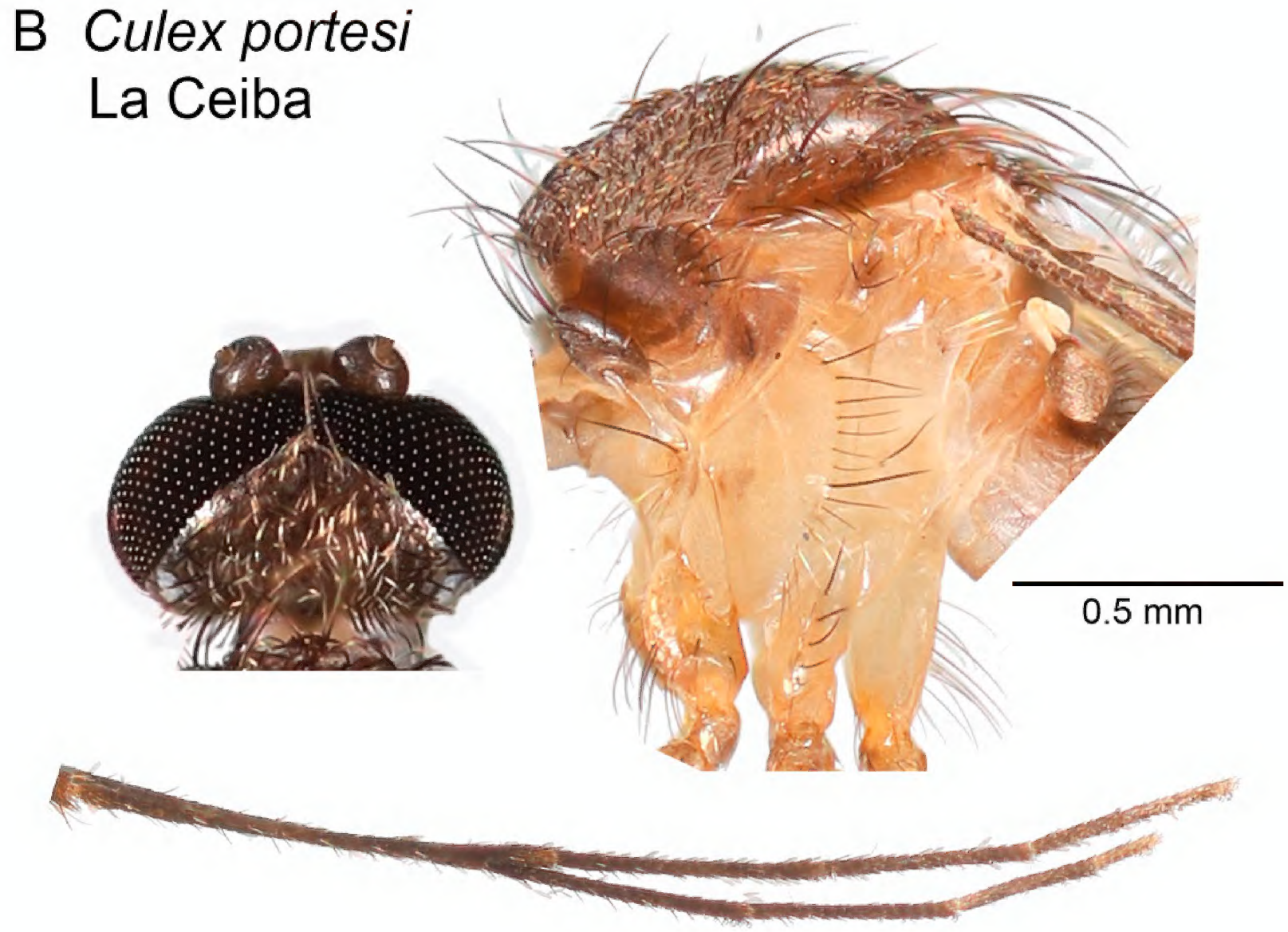

Figure 1. Spissipes section females from Guainía, Colombia. **A.** *Culex gnomatos*, occiput, pleuron, and hind tarsi. **B.** *Culex portesi*, occiput, pleuron, and hind tarsi.

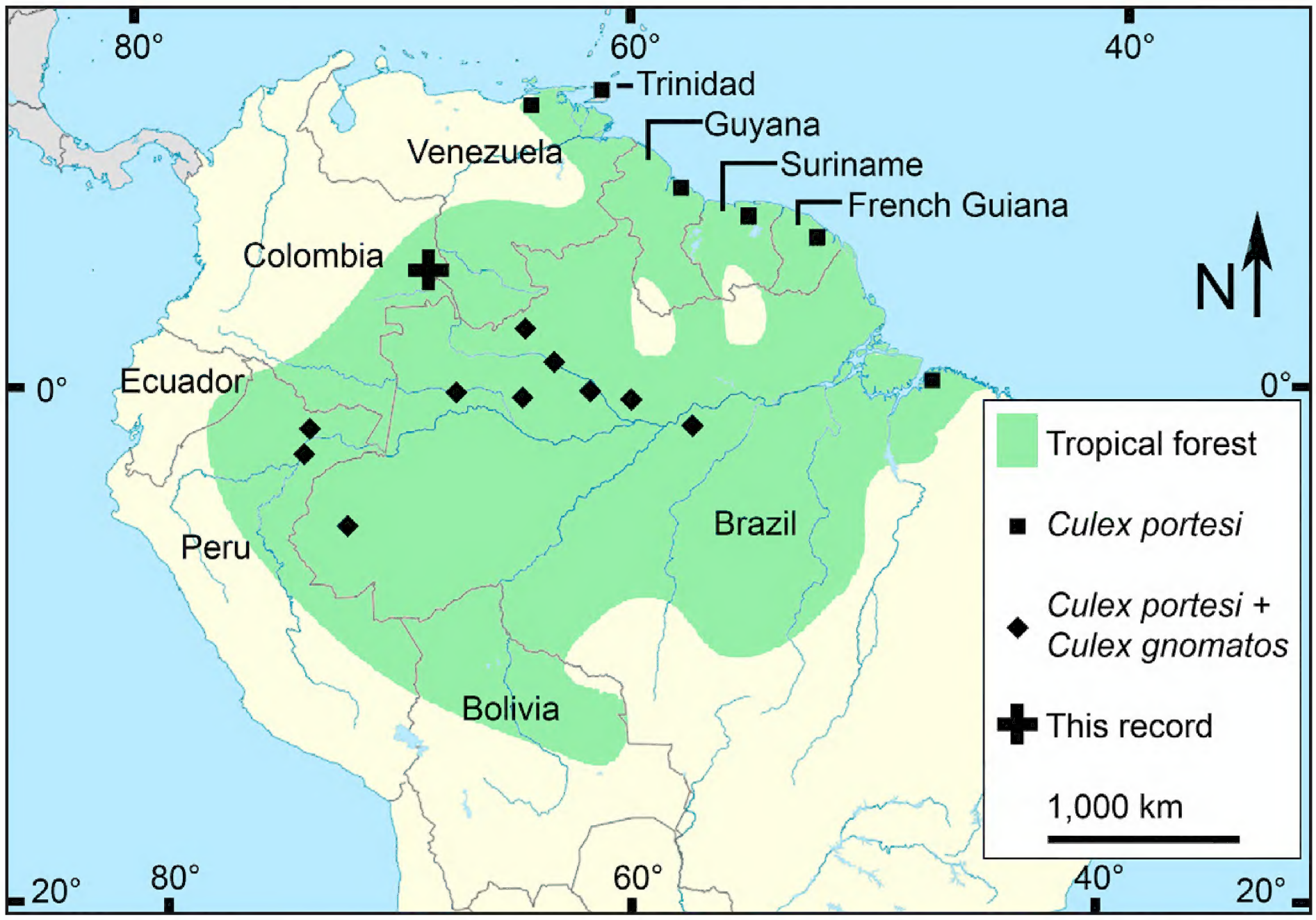

Figure 2. Map showing location of Spissipes section females in Guainía, Colombia. Base map attribution: Cephas, CC BY-SA 4.0, https://upload.wikimedia.org/wikipedia/commons/e/e8/SVG_map_of_South_America.svg.

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